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EXAMINER	
PATEL, HETUL B	
ART UNIT	PAPER NUMBER
2186	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	03/30/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 03/30/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/087,672	AASHEIM ET AL.	
	Examiner	Art Unit	
	Hetul Patel	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-11,13-19,21-26,28-34 and 36-52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-11,13-19,21-26,28-34 and 36-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the communication filed on February 19, 2007. Claims 1, 9-11, 15-16, 23, 33 and 41-44 are amended; and claims 2, 12, 20, 27 and 35 were previously cancelled. Therefore, claims 1, 3-11, 13-19, 21-26, 28-34 and 36-52 are currently pending in this application.

2. Examiner would like to thank Applicant for pointing out the omission of the rejection/objection/allowance of any type to newly added claims 45-52 in the last office action. It was due to an inadvertent oversight by the Examiner. As a result of that, this office action is made Non-final.

3. The rejection of claim 41 under 101 has been overcome by the amendment made in the last response.

4. Applicant's arguments filed on February 19, 2007 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claim 9-11, 13-19 and 21-22 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 9 is directed to a computer program per se. It requires only a flash driver having logic. A computer program is merely a set of instructions *capable* of being executed by a computer; these

instructions are not of themselves statutory (tangible). As claimed, claim 9 recites "A flash driver, comprising: flash abstraction logic, interposed between a file system and a flash memory medium...". Therefore, the claim 9 is directed to software *per se*.

"Functional descriptive material" consists of data structures and computer programs, which impart functionality *when employed as a computer component*. This is nonstatutory when claimed as descriptive material *per se*. *Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759.* When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory *in most cases* since *use* of technology permits the function of the descriptive material to be realized. However, it is not clear that the flash driver/logic is recorded on the flash memory device, as the claim language only recites that the flash device has a *system* including the driver logic.

Further, such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Language that suggests or makes optional but does not require steps to be performed or does not limit a claim to a particular structure does not limit the scope of a

claim or claim limitation. The following are examples of language that may raise a question as to the limiting effect of the language in a claim:

a. statements of intended use or field of use,

b. "adapted to", "adapted for", or "configured to" clauses,

c. "wherein" clauses, or

d. "whereby" clauses.

This list of examples is not intended to be exhaustive. See also MPEP § 2111.04. In this case, a question is raised as to whether the flash driver/abstraction logic is functional or nonfunctional descriptive material, as the claim language recites that the logic "is configured to" perform a method.

Statutory computer programs have utility when they are executed by a computer, as they then produce a "useful, concrete, and tangible result." In this case, it appears that the "flash driver having flash abstraction logic" claimed in claim 10 is never executed by a computer, nor is it recited in conjunction with a computer; therefore, Claim 9 is rejected under 35 U.S.C. 101 because the claimed invention is not supported by a specific and substantial utility.

Claims 10-11 and 13-15 are rejected on the same grounds as claim 9. While claims 10-11 and 13-15, for example, give more detail about the flash driver, the claims still have no specific and substantial utility as the flash logic is not executed, nor is the logic recorded on the flash device. The flash driver as claimed in claims 10-11 and 15 does not execute the logic, it is merely *configured to* perform certain actions. A claim

that can be read so broadly as to include statutory and nonstatutory subject matter must be amended to limit the claim to a practical application.

Claims 16-19 and 21-22 are also rejected based on the same rationale as the rejection of claims 9-11 and 13-15 as described above.

Claim Rejections - 35 USC § 112

6. Claims 9-11, 13-19 and 21-22 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a specific and significant asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

7. Claims 45 and 50 are rejected under 35 U.S.C. 102(a) as being anticipated by Hall (USPN: 6,253,281).

As per claim 45, Hall teaches a method, comprising: providing a processor-executable application (i.e. the low-level code included in the program ROM), a flash driver (i.e. the code to perform the writing in the flash memory) residing as a component within the processor-executable application; managing rules associated with operating a

flash memory medium by way of the flash driver (i.e. writing data in flash memory according to /based on the low-level code included in the program ROM); and issuing physical sector commands directly to the flash memory medium by way of the flash driver, wherein the method is flash memory agnostic by virtue of the flash driver (e.g. see Col. 5, lines 31-48).

As per claim 50, Hall teaches the claimed invention as described above and furthermore, Hall teaches about optionally selecting, by an user, to interface with the type of the flash memory medium used in a processing device (i.e. the user can select how to interface with the flash memory medium by selecting particular subroutine based on the type of flash media) (e.g. see Col. 5, lines 41-48).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1, 5-11, 15-18, 22-25, 29-33 and 37-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ban (USPN: 5,799,168) in view of Sinclair et al. (USPN: 6,725,321) hereinafter, Sinclair further in view of Blumenau (USPN: 5,875,478) and Hall (USPN: 6,253,281).

As per claim 1, Ban teaches that one or more computer-readable media (the combination of flash array and standardized flash controller in Fig. 1) comprising a flash

memory driver (the standardized flash controller in Fig. 1; i.e. the group of interfaces/controllers, between the CPU and the flash memory) that is executable by a computer to interface between a file system and one or more flash memory media, the flash memory driver comprising: flash abstraction logic (i.e. the group of interfaces/controllers, between the CPU and the flash memory) and invokable by the file system to manage flash memory operations without regard to the type of the one or more flash memory media (e.g. see Col. 2, lines 36-38); and flash media logic (a simple discrete logic or interface) configured to interact with different types of the flash memory media (any flash chip); wherein the flash abstraction logic invokes the flash media logic to perform memory operations (generic commands) that are potentially performed in different ways depending on the type of the flash memory media (e.g. see the abstract, Col. 2, lines 36-48; Col. 4, lines 33-39, 61-65 and claim 2). The further limitation of the flash memory driver is having flash memory medium agnostic is also taught by Ban, i.e. Ban also teaches that the flash memory driver, i.e. the whole group of interfaces/controllers, between the CPU and the flash memory (e.g. see Fig. 2). Therefore, even though a unique controller is being placed on each individual flash chip, "the group of interfaces/controller" as a whole manages flash memory operations without regard to the type of the one or more flash memory media as being claimed. Ban also teaches that the flash driver (the standardized flash controller in Fig. 1) is located remotely from the flash memory medium (i.e. the flash array in Fig. 1) (e.g. see Fig. 1).

However, Ban failed to teach that one of the flash memory operations includes performing wear-leveling operations associated with the flash memory medium by way of circular and continuous advancement of a write pointer. Sinclair, on the other hand, teaches about performing the wear-level operation in the flash memory by using the cyclic write pointer and single sector write management (e.g. see Col. 13, lines 46-55). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to implement the teachings of Sinclair in the flash memory driver taught by Ban so the uniform wear leveling throughout the flash medium can be achieved.

Neither Ban nor Sinclair teaches the further limitation of having the flash memory driver residing as a component within the operating system of the computer system. Blumenau, however, teaches about storing the storage drivers as a component within the operating system (OS) (e.g. see Col. 3, lines 6-26). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to include the flash memory driver taught by the combination of Ban and Sinclair within the OS as taught by Blumenau. In doing so, the different flash memory drivers can be included as a part of the OS without installing additional hardware. Therefore, the cost of hardware relative to the software driver and the size of the system the portability are reduced. Furthermore, the software drivers can be modified/added from the remote location.

However, none of them clearly disclose that the flash media logic is programmable to permit users to match particular medium requirements of a specific

manufacturer. Hall, on the other hand, teaches the flash media logic (i.e. the code in the microcontroller that contains particular subroutines which can be selected based on the type of flash media) is programmable to permit users to match particular medium requirements of a specific manufacturer (e.g. see Col. 5, lines 41-48). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to implement the teachings of Hall in the flash memory driver taught by the combination of Ban, Sinclair and Blumenau. In doing so, the end user can get the flexibility of customizing the flash memory driver by programming the flash media logic suitable for the specific manufacturer of the flash media. Therefore, it is being advantageous.

As per claims 5 and 6, the combination of Ban, Sinclair, Blumenau and Hall teaches the claimed invention as described above and furthermore, Ban teaches the flash memory driver, wherein one of the flash memory operations includes mapping status information associated with physical sectors of the flash memory medium for use by the file system, i.e. translating commands from/to physical sectors of the flash memory medium to/from commands for used in the file system (CPU) (e.g. see Col. 5, lines 29-37).

As per claim 7, the combination of Ban, Sinclair, Blumenau and Hall teaches the claimed invention as described above and furthermore, Ban teaches the flash memory driver, wherein the flash medium logic (simple discrete logic) is a user programmable to read, write and erase data to and from the flash memory medium (e.g. see Col. 3, line 49 – Col. 4, line 13).

As per claim 8, the combination of Ban, Sinclair, Blumenau and Hall teaches the claimed invention as described above and furthermore, Sinclair teaches that the flash media logic (i.e. the controller chip 8 in Fig. 2) is configured to perform the error code correction (ECC) associated with the flash memory media (e.g. see Col. 11, lines 3-7 and Fig. 2).

As per claim 16, see argument with respect to the rejection of claims 1 and 7. Claim 16 is rejected based on the same rationale as the rejection of claims 1 and 7.

As per claim 17, the combination of Ban, Sinclair, Blumenau and Hall teaches the claimed invention as described above and furthermore, Ban teaches that the flash abstraction logic that is interface/controller, between the CPU and the flash memory, passes specific commands associated with certain types of flash memory media directly to the flash medium logic (a simple discrete logic or interface) for translation and further execution (e.g. see Col. 2, lines 36-48 and Fig. 1).

As per claims 23 and 29, the combination of Ban and Sinclair teaches a processing device that uses a flash memory medium for storage of data, comprising: a file system (the flash file system), configured to control data storage for the processing device (i.e. the CPU in Fig. 1) (e.g. see Col. 2, lines 17-23); flash media logic (a simple discrete logic or interface which comprises the command register) configured to perform physical sector operations to a flash memory medium based on physical sector commands, wherein the flash medium logic comprises a set of programmable entry points that can be implemented by a user to interface with the type of flash memory medium selected (e.g. see Col. 3, lines 15-24); and flash abstraction logic that is

interface/controller, between the CPU and the flash memory, configured to maintain flash memory requirements, which are common to a plurality of different flash memory media, that are necessary to operate the flash memory medium (e.g. see Col. 2, lines 36-48 and Fig. 1).

Neither Ban nor Sinclair teaches the further limitation of having the flash memory driver residing as a component within the operating system of the computer system. Blumenau, however, teaches about storing the storage drivers as a component within the operating system (OS) (e.g. see Col. 3, lines 6-26). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to include the flash memory driver taught by the combination of Ban and Sinclair within the OS as taught by Blumenau. In doing so, the different flash memory drivers can be included as a part of the OS without installing additional hardware. Therefore, the cost of hardware relative to the software driver and the size of the system the portability are reduced. Furthermore, the software drivers can be modified/added from the remote location.

However, none of them clearly disclose that the flash media logic is programmable to permit users to match particular medium requirements of a specific manufacturer. Hall, on the other hand, teaches the flash media logic (i.e. the code in the microcontroller that contains particular subroutines which can be selected based on the type of flash media) is programmable to permit users to match particular medium requirements of a specific manufacturer (e.g. see Col. 5, lines 41-48). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current

invention was made to implement the teachings of Hall in the flash memory driver taught by the combination of Ban, Sinclair and Blumenau. In doing so, the end user can get the flexibility of customizing the flash memory driver by programming the flash media logic suitable for the specific manufacturer of the flash media. Therefore, it is being advantageous.

As per claim 24, see argument with respect to the rejection of claim 17. Claim 24 is rejected based on the same rationale as the rejection of claim 17.

As per claim 33, see argument with respect to the rejection of claims 16 and 17. Claim 33 is rejected based on the same rationale as the rejection of claims 16 and 17.

As per claim 40, the combination of Ban, Sinclair, Blumenau and Hall teaches the claimed invention as described above and furthermore, Ban teaches that the method further comprises receiving read and write commands from a file system that is inherently embedded in the controller taught by Ban (e.g. see Col. 1, lines 35-39 and Col. 2, lines 40-44).

As per claim 41, the combination of Ban, Sinclair, Blumenau and Hall teaches the claimed invention as described above and furthermore, Ban teaches that one or more computer-readable media (the combination of flash array and standardized flash controller in Fig. 1) comprising computer-executable instructions (commands stored in the command register) that, when executed, perform the method as taught by Ban (e.g. see Col. 3, lines 15-24 and Fig. 1).

As per claims 15, 30 and 38, see argument with respect to the rejection of claim 8. Claims 15, 30 and 38 are rejected based on the same rationale as the rejection of claim 8.

As per claims 9, 18, 25 and 42-43, see argument with respect to the rejection of claim 1. Claims 9, 18, 25 and 42-43 are rejected based on the same rationale as the rejection of claim 1.

As per claims 11, 31 and 37, see argument with respect to the rejection of claim 6. Claims 11, 31 and 37 are rejected based on the same rationale as the rejection of claim 6.

As per claims 10, 22, 32, 39 and 44, see argument with respect to the rejection of claim 7. Claims 10, 22, 32, 39 and 44 are rejected based on the same rationale as the rejection of claim 7.

9. Claims 3-4, 13-14, 19, 21, 26, 28, 34 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ban in view of Sinclair and in view of Blumenau, Hall and Martwick (USPN: 6,493,807).

As per claims 3 and 4, the combination of Ban, Sinclair, Hall and Blumenau teaches the claimed invention as described above. However, none of Ban, Sinclair, hall and Blumenau teaches that one of the flash memory operations includes maintaining data integrity of the flash memory medium and handling recovery of data associated with the flash memory medium after a power-failure. Martwick, on the other hand, teaches the method for updating the flash blocks so the data integrity gets

maintained and the data can be recovered upon a power failure (e.g. see Col. 3, lines 37-39). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to implement the method of updating the flash blocks as taught by Martwick in the flash memory driver taught by the combination of Ban, Sinclair, Hall and Blumenau to recognize the benefits as stated above.

Claims 13-14, 19, 21, 26, 28, 34 and 36 are rejected based on the same rationale as the rejection of claims 3 and 4.

10. Claims 46 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hall in view of Martwick.

As per claims 46 and 47, Hall teaches the claimed invention as described above. However, Hall does not teach that one of the flash memory operations includes maintaining data integrity of the flash memory medium and handling recovery of data associated with the flash memory medium after a power-failure. Martwick, on the other hand, teaches the method for updating the flash blocks so the data integrity gets maintained and the data can be recovered upon a power failure (e.g. see Col. 3, lines 37-39). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to implement the method of updating the flash blocks as taught by Martwick in the method taught by Hall to recognize the benefits as stated above.

11. Claim 48 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hall in view of Ban.

As per claims 48 and 52, Hall teaches the claimed invention as described above. However, Hall does not clearly disclose about translating the read and write commands into the physical sector commands. Ban, on the other hand, teaches the flash memory driver, wherein one of the flash memory operations includes mapping status information associated with physical sectors of the flash memory medium for use by the file system, i.e. translating commands from/to physical sectors of the flash memory medium to/from commands for used in the file system (CPU) (e.g. see Col. 5, lines 29-37). Ban also teaches that one or more computer storage media (the combination of flash array and standardized flash controller in Fig. 1) comprising computer-executable instructions (commands stored in the command register) that, when executed, perform the method as taught by Ban (e.g. see Col. 3, lines 15-24 and Fig. 1). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to implement this feature taught by Ban in the Hall's method so the data from the requested physical location can be easily retrieved and/or written.

12. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hall in view of Sinclair

As per claim 49, Hall teaches the claimed invention as described above and furthermore, Hall teaches about issuing a set of programmable entry points that can be selected by an user to perform one or more operations (i.e. particular subroutines which

can be selected by the user to perform operations based on the type of flash media) (e.g. see Col. 5, lines 41-48). However, Hall does not clearly disclose about performing the error code correction (ECC) associated with the flash memory media. Sinclair teaches that the flash media logic (i.e. the controller chip 8 in Fig. 2) is configured to perform the error code correction (ECC) associated with the flash memory media (e.g. see Col. 11, lines 3-7 and Fig. 2). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to implement the teachings of Sinclair in the method taught by Hall so the ECC can be performed on the particular/selected flash memory based on the user selection.

13. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hall in view of Sinclair.

As per claim 51, Hall teaches the claimed invention as described above. However, Hall does not clearly disclose about wear-leveling of the flash memory medium performed by way of circular and continuous advancement of a write pointer. Sinclair, on the other hand, teaches about performing the wear-level operation in the flash memory by using the cyclic write pointer and single sector write management (e.g. see Col. 13, lines 46-55). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to implement the teachings of Sinclair in the method taught by Hall so the uniform wear leveling throughout the flash medium can be achieved.

14. Claims 1, 5-11, 15-18, 22-25, 29-33 and 37-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ban in view of Sinclair, in view of Hall (USPN: 6,253,281) and further in view of Blumenau.

As per claim 1, Ban teaches that one or more computer-readable media (the combination of flash array and standardized flash controller in Fig. 1) comprising a flash memory driver (the standardized flash controller in Fig. 1) that is executable by a computer to interface between a file system and one or more flash memory media, the flash memory driver comprising: flash abstraction logic (i.e. the group of interfaces/controllers, between the CPU and the flash memory) that is invokable by the file system to manage flash memory operations (e.g. see Col. 2, lines 36-38); and flash media logic (a simple discrete logic or interface); wherein the flash abstraction logic invokes the flash media logic to perform memory operations (generic commands (e.g. see the abstract, Col. 2, lines 36-48; Col. 4, lines 33-39, 61-65 and claim 2). However, Ban failed to teach that one of the flash memory operations includes performing wear-leveling operations associated with the flash memory medium by way of circular and continuous advancement of a write pointer. Sinclair, on the other hand, teaches about performing the wear-level operation in the flash memory by using the cyclic write pointer and single sector write management (e.g. see Col. 13, lines 46-55). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to implement the teachings of Sinclair in the flash memory driver taught by Ban so the uniform wear leveling throughout the flash medium can be achieved.

Although Examiner is totally disagree but just for the sake of argument, even if Ban fails to teach (a) the flash abstraction logic manages flash memory operations without regard to the type of the one or more flash memory media; (b) the flash media logic configured to interact with different types of the flash memory media; and (c) the flash abstraction logic invokes the flash media logic to perform memory operations that are potentially performed in different ways depending on the type of the flash memory media, Hall teaches these limitations. Hall teaches that the flash abstraction logic (i.e. the code in the system controller 1 in Fig. 1) manages flash memory operations without regard to the type of the one or more flash memory media (i.e. 22 in Fig. 1), i.e. the flash memory driver is flash memory medium agnostic. Furthermore, Hall teaches the flash media logic (i.e. the system controller 1 in Fig. 1) that is configured to interact with different types of the flash memory media; and the flash abstraction logic invokes the flash media logic to perform memory operations that are potentially performed in different ways depending on the type of the flash memory media (e.g. see Col. 5, lines 31-48). Hall also teaches that the flash driver (i.e. the code in the system controller 1 in Fig. 1) is located remotely from the flash memory medium (i.e. 22 in Fig. 1) (e.g. see Fig. 1). Hall also teaches that the flash media logic (i.e. the code in the microcontroller that contains particular subroutines which can be selected based on the type of flash media) is programmable to permit users to match particular medium requirements of a specific manufacturer (e.g. see Col. 5, lines 41-48). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to implement the teachings of Hall in the flash memory driver taught by the combination of

Ban and Sinclair. In doing so, it will be appreciated by those skilled in the art that FLASH memories produced by different manufacturers require different operations to erase and/or write data to them and these sequences are stored for a number of different memories within the microcontroller ROM. Thus the disc drive manufacturer is not confined to a single FLASH memory type and the micro controller does not have to be reprogrammed if a different type of FLASH memory is used.

None of Ban, Sinclair and Hall teaches the further limitation of having the flash memory driver residing as a component within the operating system of the computer system. Blumenau, however, teaches about storing the storage drivers as a component within the operating system (OS) (e.g. see Col. 3, lines 6-26). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to include the flash memory driver taught by the combination of Ban, Sinclair and Hall within the OS as taught by Blumenau. In doing so, the different flash memory drivers can be included as a part of the OS without installing additional hardware. Therefore, the cost of hardware relative to the software driver and the size of the system the portability are reduced. Furthermore, the software drivers can be modified/added from the remote location.

As per claims 5 and 6, the combination of Ban, Sinclair, Hall and Blumenau teaches the claimed invention as described above and furthermore, Ban teaches the flash memory driver, wherein one of the flash memory operations includes mapping status information associated with physical sectors of the flash memory medium for use by the file system, i.e. translating commands from/to physical sectors of the flash

memory medium to/from commands for used in the file system (CPU) (e.g. see Col. 5, lines 29-37).

As per claim 7, the combination of Ban, Sinclair, Hall and Blumenau teaches the claimed invention as described above and furthermore, Ban teaches the flash memory driver, wherein the flash medium logic (simple discrete logic) is a user programmable to read, write and erase data to and from the flash memory medium (e.g. see Col. 3, line 49 – Col. 4, line 13).

As per claim 8, the combination of Ban, Sinclair, Hall and Blumenau teaches the claimed invention as described above and furthermore, Sinclair teaches that the flash media logic (i.e. the controller chip 8 in Fig. 2) is configured to perform the error code correction (ECC) associated with the flash memory media (e.g. see Col. 11, lines 3-7 and Fig. 2).

As per claim 17, the combination of Ban, Sinclair, Hall and Blumenau teaches the claimed invention as described above and furthermore, Ban teaches that the flash abstraction logic that is interface/controller, between the CPU and the flash memory, passes specific commands associated with certain types of flash memory media directly to the flash medium logic (a simple discrete logic or interface) for translation and further execution (e.g. see Col. 2, lines 36-48 and Fig. 1).

As per claims 23 and 29, the combination of Ban, Sinclair and Hall teaches a processing device that uses a flash memory medium for storage of data, comprising: a file system (the flash file system), configured to control data storage for the processing device (i.e. the CPU in Fig. 1) (e.g. see Col. 2, lines 17-23); flash media logic (a simple

discrete logic or interface which comprises the command register) configured to perform physical sector operations to a flash memory medium based on physical sector commands, wherein the flash medium logic comprises a set of programmable entry points that can be implemented by a user to interface with the type of flash memory medium selected (e.g. see Col. 3, lines 15-24); and flash abstraction logic that is interface/controller, between the CPU and the flash memory, configured to maintain flash memory requirements, which are common to a plurality of different flash memory media, that are necessary to operate the flash memory medium (e.g. see Col. 2, lines 36-48 and Fig. 1). Furthermore, Hall teaches that the flash media logic (i.e. the code in the microcontroller that contains particular subroutines which can be selected based on the type of flash media) is programmable to permit users to match particular medium requirements of a specific manufacturer (e.g. see Col. 5, lines 41-48).

None of Ban, Sinclair and Hall teaches the further limitation of having the flash memory driver residing as a component within the operating system of the computer system. Blumenau, however, teaches about storing the storage drivers as a component within the operating system (OS) (e.g. see Col. 3, lines 6-26). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to include the flash memory driver taught by the combination of Ban, Sinclair and Hall within the OS as taught by Blumenau. In doing so, the different flash memory drivers can be included as a part of the OS without installing additional hardware. Therefore, the cost of hardware relative to the software driver and the size of the system

the portability are reduced. Furthermore, the software drivers can be modified/added from the remote location.

As per claim 40, the combination of Ban, Sinclair, Hall and Blumenau teaches the claimed invention as described above and furthermore, Ban teaches that the method further comprises receiving read and write commands from a file system that is inherently embedded in the controller taught by Ban (e.g. see Col. 1, lines 35-39 and Col. 2, lines 40-44).

As per claim 41, the combination of Ban, Sinclair, Hall and Blumenau teaches the claimed invention as described above and furthermore, Ban teaches that one or more computer-readable media (the combination of flash array and standardized flash controller in Fig. 1) comprising computer-executable instructions (commands stored in the command register) that, when executed, perform the method as taught by Ban (e.g. see Col. 3, lines 15-24 and Fig. 1).

As per claims 15, 30 and 38, see argument with respect to the rejection of claim 8. Claims 15, 30 and 38 are rejected based on the same rationale as the rejection of claim 8.

As per claims 9, 18, 25 and 42-43, see argument with respect to the rejection of claim 1. Claims 9, 18, 25 and 42-43 are rejected based on the same rationale as the rejection of claim 1.

As per claims 11, 31 and 37, see argument with respect to the rejection of claim 6. Claims 11, 31 and 37 are rejected based on the same rationale as the rejection of claim 6.

As per claims 10, 22, 32, 39 and 44, see argument with respect to the rejection of claim 7. Claims 10, 22, 32, 39 and 44 are rejected based on the same rationale as the rejection of claim 7.

As per claim 16, see argument with respect to the rejection of claims 1 and 7. Claim 16 is rejected based on the same rationale as the rejection of claims 1 and 7.

As per claim 24, see argument with respect to the rejection of claim 17. Claim 24 is rejected based on the same rationale as the rejection of claim 17.

As per claim 33, see argument with respect to the rejection of claims 16 and 17. Claim 33 is rejected based on the same rationale as the rejection of claims 16 and 17.

15. Claims 3-4, 13-14, 19, 21, 26, 28, 34 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ban in view of Sinclair, further in view of Hall, further in view of Blumenau and further in view of Martwick (USPN: 6,493,807).

As per claims 3 and 4, the combination of Ban, Sinclair, Hall and Blumenau teaches the claimed invention as described above. However, none of Ban, Sinclair, Blumenau and Hall teaches that one of the flash memory operations includes maintaining data integrity of the flash memory medium and handling recovery of data associated with the flash memory medium after a power-failure. Martwick, on the other hand, teaches the method for updating the flash blocks so the data integrity gets maintained and the data can be recovered upon a power failure (e.g. see Col. 3, lines 37-39). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to implement the method of updating the flash

blocks as taught by Martwick in the flash memory driver taught by the combination of Ban, Sinclair, Blumenau and Hall to recognize the benefits as stated above.

Claims 13-14, 19, 21, 26, 28, 34 and 36 are rejected based on the same rationale as the rejection of claims 3 and 4.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Ishi et al. (USPN: 5,867,428) teaches about combining the memory driver into the OS (e.g. see Col. 17, lines 52-59)
- Krithivas et al. (USPN: 6,067,628) also teaches about including the filter driver, USB drivers and USB hub driver in the operating system (e.g. see Col. 4, lines 38-42)
- Mills et al. (USPN: 5,696,917) discloses programmable controller which can be programmed on a bank-by-bank basis based on the flash media type (e.g. see Col. 25, lines 13-22)
- Fandrich (USPN: 5,509,134) teaches about permitting users to match particular medium requirements of a specific manufacturer by programming the flash media logic (i.e. by customizing the algorithms stored in the program memory by programming the program memory for the controller 50 in Fig. 2) (e.g. see the abstract and Fig. 2)

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hetul Patel whose telephone number is 571-272-4184. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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